for the patient. But in the acute stage of the disease it should be cautiously used, because then it may become a source of excitement. Promiscuous dancing parties are not commendable, and it is added, with a delightful naiveté, that "in a great German city the newspapers annually contain the announcement of a brilliant ball at the lunatic asylum, with the insulting intimation that the company was not disorderly." Religious ministrations are ineffectual as a means for promoting recovery; and in some forms of melancholia the propensity of the patient to distort whatever he hears into an occasion of disquietude renders it necessary to use them cautiously and with some knowledge of the workings of the diseased mind. Clergymen get possessed with the idea that the truths of the gospel can hurt nobody, and may be profitably dispensed under all circumstances. It is obvious that those who are impatient of advice on the subject and insist upon the correctness of their own views, are liable to do harm as well as good. To obtain the greatest possible benefit from all these means, the removal of the patient to a hospital is necessary in the great majority of cases, for there only can they be applied with the ease, promptness, and regularity that will insure success.

I. R.

ART. XVI.—*On the Pathology and Treatment of Albuminuria.* By WILLIAM H. DICKINSON, M. D., Assistant Physician to St. George's Hospital and to the Hospital for Sick Children. 8vo. pp. 265. London: Longmans, Green & Co., 1868.

THIS work is by an author already well known through several able and interesting articles. It is a very favourable specimen of a class of works, yearly becoming more necessary, which combine a theoretical and clinical discussion of some one important subject.

The group of diseases which is the subject of the present volume certainly possesses great interest, and the author, in discussing them, has conjoined to a clear and impartial *résumé* of the knowledge already accumulated, a fair amount of original research and a series of well reported and highly illustrative cases.

Those diseases only of the kidneys are considered, which declare themselves by albuminous urine, the author intending, at some future time, as we learn from the Preface, to treat of the remaining disorders to which the kidney is liable.

The microscopic changes which occur in the kidney receive their full share of attention, and the first chapter contains some excellent advice, in regard to the necessity for observers to familiarize themselves with the normal appearances of these organs, and with those changes which are compatible with health. The author himself gives the results of the examination of 68 apparently healthy kidneys, and states that in but comparatively rare cases were the tubules and epithelium found typically healthy, the cells being frequently found opaque, cloudy, granular, fatty, variously coloured, or even small, irregular, and crumbling.

It should be remembered, however, that although we may find in the kidney, as in other organs, which have shown no impairment of function, slight degrees of almost every pathological change of the gland cells, such alterations can scarcely be considered to be without significance. Thus, it is true that in many chronic diseases, unattended with symptoms of renal disorder, the renal epithelium may contain oil; but certainly in such cases, it must be held that the integrity of the organ is impaired, and that probably its ability to perform its function depends chiefly upon the less degree of functional activity demanded of it in the course of such wasting diseases. And thus, on the contrary, as the observations of Dr. Dickinson confirm, it is rare to find, after acute local diseases unattended with symptoms of renal disorder, any noticeable alteration in the renal epithelium or tubules. Leaving out then the mere alterations of the epithelial cells, as not absolutely reliable evidences of disease, the author divides diseases of the kidney into three classes, according as they affect the secreting tubes with their epithelial, constituting Tubal Nephritis; the interbular fibrous tissue, constituting granular degeneration; or the bloodvessels primarily, as in the so-called amyloid degeneration. According to this view, fatty degeneration always occupies a secondary place in the tissue changes; the epithelium frequently becomes fatty as the result of tubal nephritis, but this is not the primary change, but the effect of an altered state of the nutrition of the cells, consequent upon the inflammatory stage. This entire exclusion of fatty degeneration as a separate and essential form of renal disease appears to us, however, somewhat too absolute.

A short chapter follows upon albumen and casts, in which the presence of albumen in the urine is recognized as being due to the admixture of serum which has passed from the bloodvessels into the urinary ducts. The conditions under which this occurs are mainly due to: 1st. Congestion; undue determination to the vessels supplying the glandular structures, as in cardiac disease or from renal irritants; 2d. A specific change in the arteries, as amyloid degeneration, which renders their walls unnaturally pervious; 3d. A loss by the secreting tubes of their epithelial lining in consequence of which they readily yield passage to fluids which otherwise could not traverse them unaltered.

In this summary no account is taken of those cases whose occurrence can scarcely be doubted, in which, although a slight degree of congestion may coexist, the chief cause of the escape of serum is some alteration in the blood itself.

The appearance of casts in the urine in like manner is attributed to the escape of fibrin from the capillaries, which coagulates and entangles whatever contents may be in the tube, whether blood, pus, or epithelium. The fibrin may escape from the Malpighian tuft, from the denuded wall of a tubule, or even from the wall of a tubule which is merely the seat of disturbed epithelial growth.

The author then proceeds to the consideration of various forms of renal disease, beginning with acute tubal nephritis. In this affection, which is strictly a renal catarrh, and corresponds to Johnson's Acute Desquamative Nephritis, the inflammation is limited to the mucous membrane of the tubes, and there is a rapid proliferation of cells, which may be either natural or fatty, or appear as pus corpuscles.

In cases which do not soon terminate, the disease becomes chronic and results in the production of the well-known large white kidney. A good description of the pathological anatomy of this kidney, both in the acute and chronic stage follows, but we will only allude to those points which are essential in the diagnosis of this from the two other forms of renal disease.

In the large white kidney the cells are very frequently fatty, and the tubules are either obstructed by the cells or may contain fibrinous casts; in places, they are found dilated. The capsule of the organ is thin and readily removed, and there is no increase of fibrous tissue either between the tubules or around the Malpighian body. This form of kidney generally remains large and smooth to the last, unless albuminoid change is superadded, bringing with it gradual loss of bulk and producing the small smooth kidney; in no instance, however, has the author known the loss of the contents of the tubes to be sufficient to reduce the once enlarged kidney below its natural bulk. This point will be again alluded to under the head of granular degeneration.

The predisposing causes appear to be sex, the disease being most frequent in males, even among children; and early life, the disease being common after the 2d year, but rare after the age of 40, and almost unknown after that of 50 years. Gout does not in the least predispose to it. The exciting causes are far more numerous and interesting, and are thus enumerated:—

1. Circumstances which throw upon the kidneys the work of other glands—thus cold to the surface acts by checking the perspiration; obstruction to the escape of bile; destruction of one kidney, by throwing double work upon the other (?)

2. Diseases which develop a material which acts as a renal irritant; scarlatina, measles, etc.

3. Matters taken from without, which act as renal irritants; turpentine, alcohol, cantharides, arsenic, etc.

Among adults, cold is undoubtedly the most frequent cause. It acts most injuriously when there has been some preceding cause of exhaustion, or when applied during sleep, when the body is more easily affected. The cold is also usually protracted and applied during free perspiration. This cause is not so active either in arctic or tropical climates, as in moderate ones. The reason of this is of course to be found in the general fact that those organs are most apt to be affected by the application of any morbific cause which are in the highest state of functional activity. Thus in arctic temperatures, where the function of respiration is usually active, there is a vast preponderance of diseases of the respiratory apparatus; in tropical regions, on the other hand, it is the alimentary canal and large glands in connection with it which suffer most; whilst in temperate climates, where the skin and kidneys are very active, the sudden and marked changes in temperature which so frequently occur, tend to abruptly check the cutaneous secretion, and thus induce congestion of the kidneys which but too often eventuates in inflammation. The form of nephritis thus occurring is perhaps the most rapid and congestive known; and the epithelium, according to the observations of the author, is especially apt to become fatty.

In children, on the other hand, scarlatina is by far the most frequent cause of this disorder, the kidneys being irritated by the specific poison, which is partly removed by them. The action of external cold, however, often serves as the immediate exciting cause, especially during desquamation. Albuminuria has also been observed during the course of, or as a sequel to several other diseases. Thus it has been known, in a few cases, to follow measles; in diphtheria the urine is albuminous in even a larger proportion of cases than in scarlatina, though here the albumen appears earlier in the course of the disease, is unattended with any marked diminution in the urinary constituents, or with constitutional symptoms, and nearly always disappears during convalescence. Albumen has also been detected, and usually with casts, in the course of erysipelas, typhus fever, variola, pyæmia, cholera, acute rheumatism, and in affections of the liver attended with jaundice. In all of these cases, however, though the presence of albuminuria is invariably an unfavourable sign, the affection of the kidney rarely becomes chronic and incurable.

Among irritants foreign to the system which appear to act as causes of this form of nephritis, alcohol, whether taken in substance or inhaled in the form of vapour; cantharides, whether taken internally or absorbed by the skin, and turpentine, are specially active. The observations of Dr. S. Weir Mitchell relative to the production of œdema, occasionally associated with albuminuria and tube casts, by the use of arsenic, are referred to.

The course of this variety of renal disease is then well sketched both in its acute and more chronic forms; and here, as in other portions of the work, the subject is illustrated by interesting statistics drawn from the note-books of St. George's and the Children's Hospital.

It seems that marked hæmaturia occurs in nearly one-half of all fatal cases; that frequency of micturition is much less common; while œdema is an almost invariable symptom; and dropsy, in the form of ascites and hydrothorax, stands next in frequency. Vomiting is characteristic of the disease rather than diarrhœa. Uræmic poisoning and dropsical accumulations are the chief sources of danger in the adult; while in childhood, inflammatory affections of the respiratory organs usually cut short the case. This statement, as to the comparative rarity of these latter affections in the course of nephritis in the adult, a complication which has been spoken of by several European writers as of frequent occurrence, accords perfectly with the results of hospital experience in this city. Despite these various dangers, however, the natural tendency of the disease is to recovery, especially in the more acute form; though, even in the most confirmed and seemingly hopeless cases, recovery will sometimes occur.

The changes in the urine are briefly summed up as follows: Albumen is always present, and in larger quantity than in any other form of renal disease. All the normal constituents of the urine are diminished; the water, urea, and chlorides to a greater extent than in any other disease of the kidneys. The specific gravity is rarely much below the normal standard. The colour is at first deeper, and reddish; and the urine deposits a sediment consisting of blood-corpuscles, renal epithelium, and casts of the renal tubules.

The epithelium may be fatty, natural, or pus-cells may appear in its place. The casts, in the early stage, may be either epithelial, granular, or of the small waxy form; the large hyaline casts, from straight tubules which have been deprived of their epithelium, occur only at a very late period. It will be seen subsequently that these microscopic characters are not diagnostic. We have already mentioned that the author infers from his observations that the epithelium has a much more marked tendency to become fatty in cases due to cold, than when the disease follows any other cause.

In regard to the *treatment* of tubal nephritis, after briefly stating the plans advised by the highest authorities upon renal disease, he gives that which has proved most successful in his own hands. In view of the rapid tendency to anæmia, depletion should be limited to cupping over the loins. He believes that active purgation and diaphoresis, excepting in the later stages of the disease, to effect the removal of dropsy, are apt to be injurious, since they divert the water which is needed to wash out from the tubules the plugs of epithelium which obstruct them. On this account he advises the use of diuretics, and especially of large quantities of pure water, with or without infusion of digitalis; and under this simple treatment he has found the disease, especially in children, generally to terminate favourably. It is undoubtedly true that a free use of water and unirritating diuretics is of much service, but it must also be borne in mind that hydragogue purgatives and diaphoretics are not recommended in the early stage of nephritis, merely with the view of establishing vicarious elimination of the urinary constituents, but also of relieving that congestion and incipient inflammation with which the exuberant growth of epithelium, and all the subsequent troubles, are directly connected. After the acute stage has passed, he advises iron in combination with saline diuretics.

The treatment of cerebral symptoms in the course of renal disease must be directed towards relieving the nervous disturbance and removing the retained excreta. To effect the first of these objects, alcoholic stimulants, and opiates in small and carefully regulated doses, and the inhalation of chloroform, are advised; while at the same time, active diuretics and purgatives must be administered to promote the discharge of the accumulated effete matter.

The second division which the author makes of renal disease is the well known granular degeneration, which differs widely from tubal nephritis in the seat of the lesion, its symptoms and course, as well as in the age at which it occurs, and the causes to which it is due. The affection is analogous to cirrhosis of the liver, and is here, as is usual, described as consisting in a slow chronic inflammation, which leads to a morbid increase in the intertubular fibrous tissue, beginning at certain points upon the surface and extending inwards. This new growth, as it forms, contracts, and in so doing not only incloses and compresses such parts of the gland as are in its path, but draws in the surface at its point of origin.

In the early stage the cortex is reddened and coarse-grained, and possibly a few small cysts may be detected; the organ is harder than natural, but not much altered in size In the advanced stage the kidneys are very much reduced in size and weight; the capsule thickened, opaque, and adherent; and the surface studded with prominent light-coloured, hemispherical granulations, and often presenting several cysts of various sizes.

Microscopic examination confirms the impression that there is an obvious increase of fibrous tissue in the organ, and shows that it is accumulated around the Malpighian bodies, tubules, and bloodvessels.

The tubes are found irregularly packed with detached epithelium, or dark granular matter, though this accumulation of epithelium is far less general than in tubal nephritis; or their calibre may be occupied by transparent fibrinous casts. In many cases the epithelium has been entirely removed, and the compressed and collapsed tubes resemble threads of fibrous tissue. According to Dr. Dickinson, however, in the great majority of cases the epithelium itself remains healthy, or if at all changed, merely becomes distorted from pressure. In regard to the actual anatomical conditions found in the advanced stage of granular degeneration, all observers are agreed; but it is perhaps premature, in regard to the primary nature both of this affection of the kidneys and of cirrhosis of the liver, to entirely exclude the theory that the change consists in a destructive alteration of the epithelial cells, and that the appearance of increase of the fibrous tissue is merely due to the condensation of that which naturally existed, caused by the emptying and collapse of the tubules. The cysts so constantly observed in the granular kidney are explained as arising either from transformation of tubules which have been completely occluded by the pressure of the contracting interstitial exudation, or from dilatation of Malpighian bodies due to the same cause.

The author refers to a series of experiments performed by him a few years ago, in which the obstruction to the circulation in granular kidneys was well demonstrated by passing water, with a fixed pressure and temperature, into the renal artery, and measuring the amount which escaped by the vein in a certain time. The result was, that a kidney affected with granular degeneration could not transmit one-fourth so much water as passed through a healthy kidney under the same circumstances.

The essential difference between this form of renal disease and tubal nephritis is equally shown by the difference in their causes. It is almost unknown before the age of twenty years. A case recorded in the books of St. George's Hospital, which ended at the age of eighteen years, is referred to as showing the earliest period at which the disease has been known to cause death. We have, however, during the past year, observed a case in which death took place from uræmia at the age of fifteen, the kidneys being found, after death, in an advanced state of granular degeneration.

The general conditions to which this affection can he traced are: 1. Conditions which produce and maintain venous congestion of the kidney—such as valvular disease of the heart, and pregnancy. 2. The gouty habit, from whatever circumstance it may arise, but more especially when associated with lead-poisoning. 3. A general tendency to fibroid degeneration, as shown by changes in the liver, lungs, and other organs, frequently occurring in chronic alcoholism.

Valvular disease of the heart is assigned as a frequent cause; thus in 153 cases of valvular disease examined by the author, the kidneys had granular surfaces and more or less contracted cortices in 67, and in 29 were hard, congested, and increased in bulk, but still smooth. From these and similar observation, it seems probable that in a fair proportion of cases the prolonged congestion due to cardiac disease induces granular degeneration of the kidneys; whilst in regard to the analogous affection of the liver, cirrhosis, this cause is not admitted by perhaps a majority of pathologists.

In the same way, by causing prolonged congestion from pressure of the uterus upon the renal veins and vena cava, pregnancy, especially if often repeated, may produce granular degeneration of the kidneys.

Gout is also a frequent cause of this form of renal disease, and when the influence shown by Garrod, of the absorption of lead upon the development of the gouty condition, is borne in mind together with the additional fact that many of those exposed to the influence of lead die with granular kidneys without having manifested any external gouty symptoms, the powerful effect of lead in producing this disease is evident. Thus Dr. Dickinson finds that of 42 men, having had to do with lead, who died from disease or accident in St. George's Hospital, 26 had distinct granular degeneration of the kidneys, in most cases having been the cause of death. Indeed the author asserts that at least one-half of painters eventually die from this form of renal disease.

In the following chapter the symptoms of granular degeneration of the kidneys are well described. The beginning of the disease is usually without definite cause, and so obscure and insidious that a person who has scarcely imagined himself at all out of health may be suddenly seized with cerebral symptoms due to uræmia.

Dropsy may be absent throughout the entire course of the disease, though it often occurs and usually in the form of œdema. There is marked derangement of digestion. The left ventricle of the heart becomes hypertrophied in almost 50 per cent. of the cases, and the author adheres to the explanation suggested by Dr. Bright that the enlargement is due to an alteration of the blood, which causes it to pass with difficulty through the capillaries, and thus necessitates more powerful action of the left ventricle. Atheroma of the arteries is also frequently found, having been noticed by the author in not less than 52 per cent. of 250 cases. It is interesting to recall at this point the double relationship which both cardiac disease and atheroma hold to granular degeneration of the kidneys. We have already seen that the renal disease frequently induces both the other affections; and conversely that cardiac disease is frequently attended with granular kidneys; and we have observed more than one case in which advanced atheroma of the renal arteries appeared to have been instrumental in developing this form of renal degeneration.

Inflammatory affections are much less likely to occur during the course of this disease than in tubal nephritis. On the other hand, death frequently occurs from apoplexy due to the atheromatous condition of the cerebral vessels; thus of 75 victims of apoplexy examined in St. George's Hospital during the course of twenty years, 31 are described as presenting decided granular degeneration of the kidneys. The author very justly observes that here three elements combine to favour the occurrence of apoplexy; the atheromatous condition of the cerebral arteries; the increased force of the hypertrophied left ventricle; and the increased pressure upon the arterial wall due to the refusal of the capillaries to transmit the altered blood. Another lesion due to the atheromatous condition of the arteries is apoplexy of the retina which not rarely produces dimness of vision or total blindness in the course of this disease.

The natural tendency of the fully developed and uncomplicated disease is to produce death by uræmia, the head symptoms being rather comatose in character, than convulsive, as in tubal nephritis; convulsions may, however, occur. If the causes, progress, and essentially incurable nature of granular degeneration differ thus widely from those of the preceding disease, an equally marked distinction exists between the condition of the renal secretion in the two affections. In the early stage of granular degeneration the urine is much increased in quantity, is light-coloured, and of a rather low specific gravity; and it is only in an advanced stage that the amount is greatly reduced. The urea, uric and phosphoric acids are reduced, but not to a great extent until the urine has become scanty, and the end approaches. Albumen, in some cases—as in one recently published by Dr. Murchison—does not appear throughout the course of the disease; or, if present, is variable in quantity, and often exists in small amount only. Hematuria, to an extent appreciable by mere inspection, does not occur in more than ten per cent. of all cases. Casts of the tubules may be absent in the early stages; they can usually be found later, and are present in two forms: hyaline casts, which occur in other conditions of the kidney, and a variety of granular casts which Dr. Dickinson regards as characteristic of granular degeneration, and describes as of coarse granular texture, large, opaque, and conspicuous, and probably consisting of disintegrated fibrin; whereas those in tubal nephritis are composed of altered epithelium. There is very little free renal epithelium in the urinary sediment. There is no doubt that in many cases, by careful and prolonged observation of the changes in the urine, a diagnosis may be made between the various forms of chronic renal disease; but we apprehend that the experience of most microscopists will confirm the statement, that the characters of the casts found in the urine do not constitute a reliable guide save in rare instances.

The incurable nature of granular degeneration of the kidneys is fully admitted by the author. He recommends that the *treatment* should be directed to securing a suitable climate for residence—to promoting the activity of the skin by the use of the hot-air or Turkish bath, and to the administration of some preparation of iron, preferably one of the diuretic salts, as the acetate. The food should be as non-nitrogenous as is consistent with the proper nutrition of the patient, in order to avoid any tendency to the accumulation of urea. Alcohol, in moderation, is not productive of any harm. If dropsy occur, diuretics, among which decoction of scoparium is recommended as most effective; purgatives and diaphoretics must be employed. In the treatment of the cerebral symptoms which so frequently supervene, attention is called to the fact that there is less tendency to anæmia in this affection than in other forms of renal disease, and accordingly vigorous purgation, or even free abstraction of blood, are recommended—though this latter measure is to be used only in few cases.

In the succeeding chapter the author begins the discussion of the third division of his subject—that form of renal disease depending upon the deposit of a peculiar material which has at different times received the names of waxy, lardaceous, amyloid, or albuminoid matter. As this is the portion of the work we are considering which has most claim to originality, and as the author takes up the discussion at a point only reached by the recent investigations of several observers, it may not be amiss to supplement our synopsis of his views by a brief sketch of the previous position of the question.

The first recognition of the so-called amyloid disease does not date further back than 1832, when Hodgkin, and a little later, Bright and Carswell described it—regarding it, however, as a form of malignant disease. Subsequently Rokitansky asserted that it was a species of fatty degeneration. And more recently—indeed until within the last ten years—it was considered, as by Budd, Bennett, and Gairdner, as an albuminoid degeneration. About this time, however, the theory was advanced by Virchow, that the morbid material deposited in these cases is starch-like in nature; and consequently he bestowed upon the disease the term amyloid degeneration. The peculiarity of this deposit, according to him, is that it never becomes blue under the action of iodine alone, but assumes a peculiar yellowish-red—which however, it is true, has in many cases a tinge of reddish-violet. "On the other hand, it displays pretty regularly either a real perfectly blue, or violet colour, when the application of iodine is followed by the very cautious addition of sulphuric acid." Thus he considered this substance less nearly allied to starch, properly so called, and more akin to cellulose, though it is also distinguished from the latter by the fact of its becoming coloured upon the application of iodine alone.[1]

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[1] Cellular Pathology, Chance's Trans., p. 414.

Finally, in opposition to these views of Virchow, the theory was advanced by Meckel, that this form of disease is due to the deposition of a peculiar fat, more or less nearly identical with cholesterine, and hence he suggested that the morbid condition should be called the cholesterine disease. This last view, it will be noticed, approaches the one formerly held by Rokitansky and others. In this position, then, the question remained, the opposing theories being maintained by their separate proposers and a few adherents; but a large majority accepting, from the large weight of Virchow's authority, and the positive nature of his observations, the view that the morbid deposit is an amyloid material. Quite recently, however, the whole subject has been very carefully re-examined, especially by Pavy[1] and Dickinson,[2] from whose memoirs much of the present description is derived. In the first place, it has been determined by elementary analysis by Schmidt, Friedréich and Kekule, Pavy and Odling, that the so-called amyloid substance is, in reality, as highly nitrogenized as albumen itself. Still further, it has been a matter of frequent experience with numerous observers, that in cases where the organs were undoubtedly the seat of this peculiar deposit, iodine and sulphuric acid would not produce the peculiar colour changes described by Virchow.[3]

On the other hand, as stated by Dr. Pavy, on applying to the cut surface of a so-called amyloid organ, a strong solution of iodine, the parts pervaded by the deposit gradually assume a dark-brown colour, whilst the healthy tissue remains only slightly tinged by the reagent. The addition of sulphuric acid, instead of developing a blue colour, produces blackening of the tissues, from a precipitation of iodine from the iodide of potassium used in the solution. Once more, Dr. Pavy has ascertained by experiment that if either tallow, lard, or stearine are treated with iodine and subsequently with sulphuric acid, a beautiful colour, varying between violet blue and purple will be developed. Cholesterine is not affected by iodine alone, but the subsequent addition of the acid brings out a deep blue tint. It is therefore possible that the presence of fatty matter may in some amyloid organs have given rise to a blue colour; but the really characteristic reaction with iodine, as mentioned above, is preserved after all the fat has been extracted from the affected organ.

It appears, consequently, that not only were Virchow's observations, as to the production of the starch reaction, and his inferences therefrom, fallacious, but that elementary analysis proves that nitrogen is present in large amount in the so-called amyloid material. It is evident then that this peculiar deposit can be neither amyloid nor fatty in character, but that it is, in all probability, either albuminoid or fibrinous.

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[1] F. W. Pavy, M. D., on so-called Amyloid Degeneration, Guy's Hosp. Rep., 1864, p. 315.

[2] W. H. Dickinson, M. D., Med.-Chir. Trans., vol. L., 1867, p. 39.

[3] We have frequently observed this during the past few years, and, while writing this review, have had the opportunity of carefully testing the organs in two cases of very extensive and advanced albuminoid degeneration, and found that iodine and sulphuric acid gave no amyloid reaction, though iodine alone developed in great perfection the peculiar effect above noticed. Indeed, the only recent observer we are familiar with who upholds Virchow's statement is Hayem (*Comp. Rend. de la Soc. de Biol.; Syd. Soc. Biennial Retros.*, 1865–6, p. 176), who, in speaking of "amyloid degeneration of the alimentary canal," says that "on treating the patches with water containing iodine, the whitish lines immediately assume a brownish-red colour, which is changed to a bluish-violet on the addition of a little sulphuric acid."

In the paper already referred to, Dr. Dickinson has carried the inquiry one step further, and appears to have determined the actual character of the substance to be a form of fibrine which has been deprived of its alkali. The following conclusions show in a concise form the various steps of the argument:—

1. The morbid deposit loses its characteristic reactions when it has been allowed to absorb potassa or soda, although the affected tissue may be dried, boiled, soaked in alcohol, in strong acids, or in caustic ammonia, and still retain it.

2. Organs containing this deposit yield on analysis a smaller proportion of the alkalies than do the same organs in a state of health. This reduction is so great in well-marked cases, that the affected structure has a decidedly acid reaction.

3. Ordinary fibrin or albumen can be made to exhibit all the peculiarities of so-called amyloid tissue by depriving them of alkali by artificial means.

As an additional test for this morbid deposit, no less striking than iodine itself, Dr. Dickinson recommends sulphate of indigo. If healthy tissue be soaked in a weak solution of this, it assumes a blue colour, which after a time fades into a pale greenish-blue. Portions of organs affected with this disease, however, retain a deep brilliant blue colour. "The power of decolorizing sulphate of indigo is known to belong to the caustic alkalies; and under the circumstances described the destruction of colour appears to be due to free alkali contained in the healthy tissue; while the colour is retained in the morbid deposit, owing to the absence of this component." It has long been observed that the tendency to this form of disease appears in various cachectic states of the system, especially in chronic tuberculosis, syphilis, and chronic bone disease. Nearly all such cases are attended with more or less profuse suppuration; and indeed of 109 cases of so-called amyloid disease in which the antecedent history could be traced, Dr. Dickinson found that in 83, or more than three-quarters, there had been undoubted suppuration, while in the remaining 26 the preceding disorders were of such a nature as to make it probable that in the greater number there had been at some period a discharge of pus. Regarding then the so-called amyloid deposit as dealkalized fibrin, and analysis having shown that pus is an albuminous fluid containing a large amount of potassa and soda, he views the morbid deposit as of the nature of a residuum, occurring in cases where the system has been drained by an alkaline albuminous discharge, and the blood consequently contains an excess of fibrin with a deficiency of alkali. He also discards the various names under which this disease has been known, and suggests the term "Depurative," as significant of the process which is its most frequent cause. He argues that "under this designation the false conceptions would be avoided which attach to the phrases by which the process has been hitherto described, and a clear assertion would be made of the great practical truth that in all cases of protracted suppuration the deposit in question is a probable contingency." He himself adds in a foot-note that "it has been objected to this word, that depurate is already in use in the sense of purify. This, however, appears to be of small consequence, since no confusion is likely to result. The fault rests with those who originally permitted the identity of root between the words pus and purus."

It is not, however, quite clear to us that either the reason given in the text, or the scrap of philology in the foot-note, justify the new christening to which he has subjected the disease in question. It is evident that the term "amyloid" can no longer be defended on any ground, and that the names "waxy" and "lardaceous" are chemically inaccurate, though applicable to the physical appearances of the diseased organs. But is seems to us that the term "albuminoid deposit," though doubtless not perfectly expressive, sufficiently well describes the lesion to justify its retention in use. It is to be remembered that there is no actual proof, as yet, that the morbid deposit is fibrinous rather than albuminoid, since either albumen or fibrin will answer the chemical requirements of the case; nor, although the suggestion is an ingenious one, and certainly well borne out by the clinical history of the disease and the composition of pus, can it be considered as established that the prolonged discharge of pus is the essential cause of the morbid deposit. The author himself suggests that it may eventually be shown that there are diseases which act upon the blood so as to produce the effect of a purulent discharge, and thus occasion the deposit without the medium of suppuration. We cannot, therefore, even on clinical ground, regard the term "depurative" as desirable; and in regard to the philological objection to the word, it may be added that not only is "depurate," as derived from *de* and *puratus*, or *purus*, in common use, but that various forms of the verb, and adjectives and substantives formed from it, are to be met with in innumerable places, both in medical and general literature, as far back at least as Raleigh or Sydenham. Surely the "*jus et norma loquendi*" may be pleaded by any who prefer adhering to the custom of those who originally admitted this time-honoured word in its proper sense.

Before leaving the general discussion of this subject, we may add that, from the statistics which the author has collected, syphilis does not seem to produce this form of disease, except by causing bone disease or extensive ulceration.

The kidneys are very favourite seats for the so-called "amyloid deposit," and when not attacked first, usually become involved so early in the course of the disease, that the change in their secretion is one of the first symptoms noticed.

When the kidney presents an advanced stage of this alteration, the organ is increased in size and heavy, weighing from 10 to 16 ounces; the cortex is firm, pale, and increased in thickness, and, when no fatty tendency coexists, often has a pinkish or gray translucency. The capsule is adherent, and often thickened. The external surface is smooth and pale, though dotted with stellate vessels or irregular red patches. According to Dr. Dickinson, the morbid material tends to contract, and in a very advanced stage the surface may become uneven, presenting large, smooth elevations, or irregularly deformed in some places.

There is not, however, seen as a consequence of this form of disease the regular covering of uniform small granulations, characteristic of granular degeneration. Cysts are often found, as in the other form of intertubular disease, and are here due, likewise, to the contraction of the morbid deposit, constricting the tubules and leading to a cystic dilatation of their upper portion or of the capsule of the Malpighian tuft. In all stages, iodine furnishes the characteristic reaction; early in the disease merely dotting the Malpighian bodies, while later, brown lines become visible in the cones, and finally almost the whole surface of the section gives the characteristic colour. Here as elsewhere the change first affects the minute arteries, then leads to an intertubular effusion and finally induces changes in the tubules which cause them to become plugged up. The vessels of the Malpighian tuft are first affected, and subsequently the straight vessels between the tubes. The material poured out between the tubules has at first a closely nucleated structure, like that presented by new fibrous tissue or some varieties of fibro-nucleated growths. The same material also escapes from the exposed vessels of the Malpighian tufts and appears in the tubes and in the urine in the form of casts, which occasionally present the characteristic reaction with iodine. The tubes themselves remain rigidly open, and the epithelium holds to the wall with unnatural firmness, as though the wall were thickened, and the cells partially fused upon it. The epithelium is rarely much altered, though occasionally the cells are fatty or distorted in shape. Hence kidneys in this state of disease furnish the most typical demonstrations of the renal tubules. The tubes often contain fibrinous plugs, or, as already stated, are transformed into cysts.

In explaining the mechanism of the disease, the author apparently regards it as a purely mechanical process. He states that the dealkalized fibrin is deposited in the smallest arteries, where the force of the circulation is diminished and the blood current retarded. This process, though it thickens the walls, renders them more permeable and hence the liquor sanguinis, holding in solution albumen and the modified fibrin, freely exudes into the tissues. There appear to us, however, some difficulties in accepting this purely physico-chemical explanation of the disease, and it may be doubted whether its essential nature does not rather consist in a morbid alteration of the cells, first of the middle coat of the minute arteries, and afterwards, as in granular degeneration, of the intertubular tissue.

A clear and concise clinical history of the disease follows, illustrated by numerous well recorded and very typical cases. The affection is most frequent between the ages of 20 and 30 years; its period of greatest mortality being later than that of tubal nephritis, but earlier than that of granular degeneration. Dropsy, both in the form of œdema and ascites, is usually present, but the pleura and pericardium generally escape. There is a marked tendency to inflammatory complications, especially pneumonia and pleurisy; but, on the other hand, cerebral symptoms are rarely developed, occurring but six times in a series of forty-eight cases, in which the renal disease was marked. Vomiting and diarrhœa are of very common occurrence, often depending upon albuminoid degeneration of the alimentary canal. Indeed diarrhœa, together with the inflammatory complications before alluded to, constitute the chief causes of death. There appears to be no tendency to atheroma of the vessels, to hypertrophy of the heart, to extravasation of blood in the brain, or to affection of the retina.[1]

The disease is essentially chronic, though it not unfrequently remains latent until a few weeks or months before death. One case however is narrated in which the patient, a vigorous young man, died of pyæmia on the twenty-first day after amputation of the thigh, and at the autopsy the kidneys were found the seat of positive albuminoid disease.

The condition of the urine resembles, in many particulars, that in granular degeneration. The quantity is much increased at first, but subsequently diminishes, comparatively rarely, however, falling below twenty fluidounces. The increase in quantity persists even when œdema is present, and the coexistence of these two conditions is regarded by the author as characteristic of this form of renal disease. Blood is rarely present, but albumen appears early, and gradually increases until it is sufficient to form a bulky coagulum. The sp. gr. is reduced to from 1015 to 1006, or even lower; the acidity is diminished, and all the other elements are reduced in amount. The urea, however, is not lessened to the same extent as in the other forms of renal disease. Casts appear at an early period, and are usually present in abundance throughout the course of the disease. They are of the fibrinous and epithelial forms, and present nothing peculiar, save in the rare cases, when they yield the characteristic reaction with iodine. The diagnosis then chiefly rests upon the antecedent history of the case, the coexistence of dropsy and increased secretion of urine, the fact that the kidneys rarely remain the only organs affected, but that the liver and spleen ultimately enlarge, the frequency of diarrhœa and the rarity of cerebral symptoms.

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[1] Dr. Grainger Stewart, in the *Med.-Chir. Rev.* of January, 1868, p. 201, quotes a series of cases of albuminoid degeneration in which hemorrhage was observed in the spleen, in the skin, in mucous and serous membranes, in the substance of muscles, in the mucous membrane of the intestines, and perhaps in the kidney also.

In regard to the *treatment*, the author recommends that, when possible, the cause should be removed; but that if it be impossible to check the drain upon the system, attempts to counterbalance its effects should be made by administering an animal and albuminous diet, conjoined with the internal use of alkalies. In addition to this, special symptoms must be palliated, the dropsy and diarrhœa combated by suitable means, and iron and cod-liver oil given to remove the anæmic and cachectic state the patients are usually in. If there be a syphilitic taint, iodide of potassium or iodide of iron may be conjoined. It is evident that this new view of the origin of this form of renal disease, if substantiated, would have a most important bearing upon surgical operations. It has long been generally understood that the existence of renal disease, as manifested by the presence of albumen and tube-casts in the urine, constitutes a most grave contraindication to the performance of any serious operation. In regard to lithotomy, this is, indeed, specially true, since in such cases albuminuria but too frequently indicates a suppurative form of nephritis, with actual destruction of the tissue of the kidneys. The existence, however, of granular degeneration or of chronic tubal nephritis would also be regarded as a most unfavourable complication. But if it be ultimately shown conclusively that the albuminoid degeneration depends essentially upon purulent discharge, this form of renal disease will have a very different significance. It cannot, indeed, be hoped that those portions of tissue which are permeated by the new deposit, can ever be fully restored to health, but it is quite possible that, if the cause be removed, the disease will not progress further. Although therefore its presence would, of course, be unfavourable to the success of the operation, it would, to a certain extent, encourage its performance. And further, as Dr. Dickinson argues, if in any case of chronic bone disease, a careful examination of the urine reveals that the kidneys are undergoing this change, it would be prudent to avoid any of those conservative operations which necessitate a long and exhausting process of repair, and to resort rather to amputation.

In Chapter XIV. is presented a clear and concise comparative view of the three forms of renal disease discussed in this volume, illustrating statistically and by diagrams the differences which exist between them, both in causes, symptoms, complications, and modes of termination.

The state of the blood in albuminuria is treated of briefly in the following chapter, and a few of the most authoritative analyses of the blood in this disease are quoted, as evincing the general law that in albuminuria, the albumen and corpuscles of the blood are diminished, while the water, fibrin, salts, creatine, creatinine, and extractive matters are increased. Urea and uric acid are superadded. These statements hold good in all forms of albuminuria. Undoubtedly much remains to be learned, especially as to the varied degree of these alterations in the different forms of renal disease. As yet, one of the most interesting generalizations which can be made from the facts already known is, that "the general condition expressed by the word uræmia, must be held to imply nothing more specific than that the blood is altered by the presence of materials which, in their own shape, or under another guise, ought to have passed out by the kidneys."

It is customary to refer a large share in the production of renal disease to the excessive use of alcohol, but Dr. Dickinson has been led, from a careful investigation of the subject, to doubt the propriety of this. He presents some interesting statistics in regard to this question, which have been obtained by an examination of the kidneys of patients dying with delirium tremens, and from the records already published of the post-mortem appearances of the bodies of persons who had been notorious drunkards, and who met a sudden death by accident or suicide; and it appears from these that so far from intemperance being a very frequent cause of renal disease, the kidneys participate but slightly, compared to the liver, in the injurious effects of an excessive use of alcohol. Granular degeneration, indeed, appears, from the author's table, to be absolutely less frequent after delirium tremens than when death has resulted independently of alcoholic poisoning. Alcohol, it is true, frequently causes an increase of oil in the renal epithelium, and in some cases gives rise to changes in the tubular structure which indicate an inflammatory or catarrhal condition. These statements are corroborated by the reports of the Registrar-General, which have enabled the author to compare the number of deaths due to alcohol and renal disease respectively, in various parts of Great Britain. It appears from this comparison that renal disease is absolutely more common in the sober agricultural districts than in large towns. We are, however, prevented by want of space from commenting on these conclusions, which are certainly not in accordance with our preconceived views.

We have already referred to the great climatic law, that renal disease is most frequent neither in arctic nor tropical climates, but in those parts of the temperate zone where the most marked and sudden variations in temperature occur. In such places the functional activity of the kidneys is very great, and owing to the intimate relation subsisting between them and the skin, the rapid changes in the circulation of the surface induce frequent attacks of renal congestion, which but too often pass into a condition of fully-developed and intractable inflammation. Dr. Dickinson has illustrated this in an interesting manner by statistics drawn from the Registrar-General's Reports, and from the Army Medical Reports. Want of space, however, forbids us to quote any of the details, from which it appears that not only does this general law hold good in regard to countries widely separated from each other, but that its working may be traced with equal certainty within the limits of so small a country, geographically considered, as Great Britain. This is well shown, for instance, by comparing the east coast with the west. On this latter coast, where there is scarcely heat enough in summer to ripen wheat, but where the winters are warm from the influence of the Gulf stream, so that a very uniform temperature prevails throughout the year, renal disease is not one-half so frequent as on the eastern side of the kingdom, where the weather is both colder and hotter than on the Atlantic shore, and undergoes much larger and more frequent variations. It does not, however, appear that there is any direct connection between the humidity of the air and the frequency of renal disease. It is, of course, evident that the influence of these atmospheric conditions, does not affect the so-called amyloid degeneration of the kidneys, which is scarcely a primary disease, but owes its origin to various constitutional causes. The practical inference to be drawn from these facts is obvious, and the advice given by the author is to be highly commended. He urges that in granular degeneration, which appears to have a close dependence upon atmospheric influences, and where the structure of the organ is invaded by slow and often hesitating approaches, a warm and constant climate should be sought, "where the genius of the place is opposed to the progress of the complaint."

In concluding this notice we must again repeat our sense of the value of the work we have been discussing. Without pretending to produce an exhaustive treatise, the author has combined a clear and fair summary of the facts generally received in regard to renal disease, with a full and valuable clinical description of its various forms. In addition to this, he has given the most complete account of the so-called amyloid degeneration as affecting the kidneys, and has made out a strong case in favour of the theory he advances to explain its nature and origin. It is impossible, however, to reproduce here the features which give to the work much of its value—the full statistical tables, the numerous well-reported cases, and particularly the admirable illustrations both of the gross and microscopical appearances in the various forms of renal disease. These are executed in a high style of chromo-lithographic art, and combine all that can be desired in medical illustrations.

The book is handsomely printed, and the text, though exhibiting occasionally peculiarities of phraseology and style, is unusually free from inaccuracies.

W. P.